

Biological rhythms: we (our bodies) follow a couple of rhythms...kind of like tides of the ocean

- 24 hour biological clock
- 90 minute sleep cycle

Circadian Rhythms: regular bodily rhythms

- roughly a 24 hour cycle
 - o body temp rises closer to morning, then peaks, and dips again in early afternoon (why many people take a siesta), then drops before we go to sleep
- thinking is sharpest and memory is most accurate when we are at our peak in our circadian
 - o pulling an all nighter = groggy, and then get a second wind after our normal wake-up time
- bright light can alter/reset our rhythm

Sleep:

- every 90 minutes 5 stage cycle of sleep
- 1/3rd of our lives is spent sleeping
- Follow a daily cycle, the time we spend asleep and awake depends on a 24 hr cycle of the sun
- Sleep/wake cycles change with the seasons, we sleep more in the winter and less in the summer

Just before you go to sleep you are experiencing **alpha waves**

- relatively slow wave of a relaxed person

Stages of Sleep

Stage 0 (aka twilight or presleep)

- Relaxed wakefulness
- Just before you fall asleep
- “Jerk back to consciousness”

Stage 1

- Only a few moments
- Slowing of pulse
- Muscles relax
- Easily aroused, and once awake may even be unaware that you were asleep

Stage 2 and 3

- Progressively deeper sleep
- Heart rate, blood pressure and temp. continue to drop
- More difficult to wake from
- 45-50% of the night

Stage 4

- Very difficult to wake from (groggy, confused)
- Brain is emitting **delta waves**
 - Large slow brain waves associated with deep sleep
- Heart rate, etc as low as they will go
- 15-20 mins. (1st time)

Journey from stage 1-4 takes about 30 mins

REM – Rapid Eye Movement

- Most difficult to wake from
- Brain waves become very rapid (saw tooth)
- Heart rate rises
- Breathing becomes rapid and irregular
- Brains motor cortex is active, but the brain stem blocks the messages
 - In effect you are paralyzed
- 1st period of REM sleep only lasts about 10 mins.
- About 45 mins at the end of the night
- 25% of the night

Cycle: 0,1,2,3,4,3,2,REM,2,3,4,3,2,REM,2,3,4,3,2,REM...

- Cycle repeats about every 90 minutes
- REM and stage 2 get longer,
- 3 and 4 get shorter each time through the cycle
- 4-5 cycles per night (4-5 dreams EVERY night, even if you don't recall) 1, 2, 3, 4 of NREM (nonREM)

Amount and type of sleep change with age:

- 50% of sleep in infants = 13-16 hrs of sleep per day
- Adults 25% = REM
- 70 years old, only 6 hrs of sleep per day

- **Sleep deprivation** = 1/3 to 1/2 of us
 - Brain will keep track of your sleep debt for about 2 weeks
 - Increases the hunger hormone (ghrelin) and decreases the hunger – suppressing hormone (leptin)
 - Increases stress hormone (cortisol)

Functions of Sleep:

1. protects – our ancestors were safer when in the cave at night rather than out hunting and gathering
2. brain – restore and repair brain tissue
3. making memories – restore and rebuild our fading memories of the days experience
4. growth – pituitary gland releases a growth hormone